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(54) Toolholder for milling drums for removing ground

(57) The invention realizes a toolhead or toolholder suited to be applied to the prismatic base of a working member for ripper or milling drums of machines for removing ground, comprising a tapering cylindrical body (6) that is coupled into a corresponding tapering cylindrical hole (5) of said prismatic base (3) and presents one end (7) having a seat (8) that holds the shank (9) of a ripper tool (10). Said toolhead have the longitudinal axis (11) of said tapering cylindrical body (6) at an angle to the longitudinal axis (12) of said seat (8).

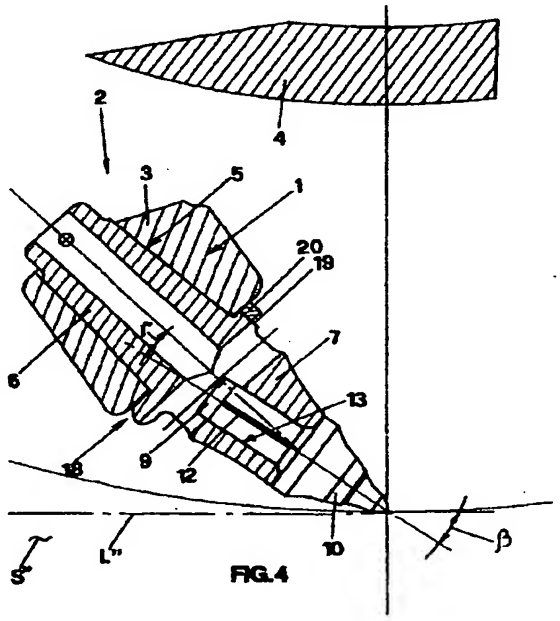

FIG.4

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Description

[0001] The invention concerns an improved type of toolhead suited to be applied to the working members of ripper drums belonging to vehicles for the removal of ground.

[0002] It is known that to remove ground and especially for removing the bitumen course that surfaces roads, special vehicles called scarifiers are used.

[0003] These machines are fitted with a ripper drum with a series of protruding working members which, as the ripper drum rotates, break up the ground that has to be removed as they come into contact with it.

[0004] Each working member is made up of a ripper tool pressure mounted in a toolhead, where it is free to swivel around its axis but cannot separated from it by the blocking action generally exerted by interjected elastic parts.

[0005] The toolhead consists of a body preferably in steel primarily having a longitudinal construction, which is shaped to provide a seat that receives the shank of the ripper tool. The toolhead is in turn is inserted by an extractable coupling in a hole made in a basically prismatic shaped base, which is fixed by an extractable coupling to a bed plate welded to the drum or it may otherwise be welded directly to the drum.

[0006] The aforementioned type of working members and relevant toolheads are also described in the patent applications having deposit numbers VI95A000170 and VI98U000097, registered in name of the same depositee of this invention, where the seat in the toolhead, that receives the shank of the ripper tool, consists of a hole that is coaxial to both the longitudinal axis of the toolhead and to the axis of the hole made in the prismatic base that holds the toolhead.

[0007] The working members described in the aforementioned patents are set on the ripper drum in different ways depending on the different use that the ripper drum is prepared for.

[0008] In the case where the ground to be removed is of medium consistency and the intention is to take away large quantities thereby reducing work times to a minimum, then so-called "high speed" ripper drums are used.

[0009] A high speed type of ripper drum T from known technology is illustrated in fig. 1 where it shows the toolhead, generally indicated by A, has a longitudinal axis a that is the same as the longitudinal axis of the tool U and creates an angle α of approximately 45° with line L of the ground S that is a tangent to circumference C traced by point P of the tool during rotation of the ripper drum T.

[0010] Clearance angles of 45° with the ground are not suitable for working on particularly hard ground because bending moments are generated on the working member that would damage the tool and its relevant toolhead and could sometimes even break them.

[0011] This is why, when particularly hard ground has to be removed then so-called "high penetration" ripper drums are used.

[0012] A high penetration type of ripper drum T' from known technology is illustrated in fig. 2 where it shows the toolhead, generally indicated by A', has a longitudinal axis a' that is the same as the longitudinal axis of the tool U' and creates an angle α' of approximately 42° and 30' with line L' of the ground S', being a tangent to circumference C' traced by point P' of the tool during rotation of the ripper drum T.

[0013] However, the solution in execution just described, as seen in fig. 2, has the inconvenience that a decrease in pitch of the clearance angle with the ground, leads to the toolhead and the prismatic base being scraped by the material being removed, which abrades them leading to rapid wear and sometimes even breakage.

[0014] The user must therefore be equipped with different types of ripper drums to fit the type of work that has to be carried out, with the inconvenience that, the changeover from one type of work to another implies additional direct or indirect costs related to changing the drums.

[0015] This invention intends to overcome the commonly accepted inconveniences expostulated above.

[0016] In particular, the scope of the invention is to produce an improved type of toolhead that, when applied to the same prismatic base of the working member, achieves angles of impact with different pitches between the ripper tool and the ground being removed.

[0017] Another scope is that the same prismatic base can hold different kinds of toolheads, each suited to create different angles of impact between ripper tool and the ground being removed.

[0018] Said scopes are achieved by producing a toolhead suited to be applied to the prismatic base of a working member for ripper drums of scarifier machines for the removal of ground that in accordance with the main claim comprises a tapering cylindrical body that couples into a corresponding tapering cylindrical hole of said prismatic base and has an end provided with a seat that holds the shank of a ripper toot and is characterised in that the longitudinal axis of said tapering cylindrical body is set at angle to the longitudinal axis of said seat.

[0019] According to a preferred form of execution the tapering cylindrical body of the toolhead has a through hole whose longitudinal axis is tilted and coplanar to the longitudinal axis of the seat made in the end of the actual toolhead that holds the shank of the ripper tool. In particular, the seat consists of a cylindrical hole where its outer circumference around the entry section of the ripper tool's shank has its centre set along the longitudinal axis of the tapering cylindrical body.

[0020] Each toolhead also has an abutment that is set against corresponding markers on the prismatic base, suited to position the toolhead and thereby the ripper tool that it holds, according to different clearance angles with the ground.

[0021] An advantage in the use of the toolheads under this invention is that they allow the use of a sole ripper drum to remove different consistencies of ground, by simply varying the toolhead set-up in the seat of the same prismatic base or using the same prismatic base to mount toolheads having ripper tool seats with different pitches.

[0022] The aforesaid scopes and advantages shall be better explained during the description of a preferred form of execution of the invention that is given as a guideline but not a limitation and that refers to the attached diagrams, where:

- fig.'s 1 and 2 illustrate two working members with relevant toolheads from known technology;
- fig. 3 illustrates the toolheads invention;
- fig.'s 4 and 5 illustrate the toolheads in fig. 3 applied in two different ways on the same prismatic base.

[0023] As can be seen in fig.'s 3 to 5 the toolheads invention, generally indicated by 1, belonging to a working member generally indicated by 2 that comprises a prismatic base 3 fixed to the ripper drum 4, provided with a tapering cylindrical hole 5 that holds by an extractable coupling the tapering cylindrical body of the toolhead 1. One end 7 of the toolhead 1 protrudes from the prismatic base 3 and is provided with a coupling 8 that receives the shank 9 of a ripper tool 10.

[0024] According to the invention, the longitudinal axis 11 of said tapering cylindrical body 6 is at an angle to the longitudinal axis 12 of said seat 8.

[0025] As can be seen in fig. 3, the seat 8 is a cylindrical hole 13 that holds the shank 9, also being cylindrical, of the ripper tool 10.

[0026] Preferably, as can again be seen in fig. 3, the tapering cylindrical body 6 of the toolhead 1 has a longitudinal through hole 14 to insert a pushrod, not illustrated, to extract the tool 10 in case of need.

[0027] In Particular, it can be seen that the longitudinal axis 11 of the tapering cylindrical body 6 passes through the centre 15 of the circumference, indicated by 16, that in the end 7 of the toolhead 1 creates the entry section, indicated by 17, of the shank 9 on the ripper tool 10, into the cylindrical hole 13.

[0028] The tapering cylindrical body 6 of the toolhead 1 has a radial collar 18 that acts as a bonding element with the end 7 and is provided with an abutment 19 that is set against a respective marker 20 fixed to the prismatic base 3 to prevent the toolhead from rotating during work.

[0029] According to this configuration the clearance β of the ripper tool 10 with the ground being removed S" is the angle between horizontal line L" of the ground S" and the longitudinal axis 12 of the cylindrical hole 13 that holds the shank 9 of the ripper tool 10. This angle β is less than the clearance angle a that can be seen in fig. 1 and is obtained by using already existing toolheads.

[0030] In particular the clearance angle β depends on:

- the pitch γ between longitudinal axes 11 and 12 of the shank tapering cylindrical 6 and the cylindrical hole 13 respectively;
- the position of the toolheads 1 mounted in the prismatic base 3 as seen in fig. 4.

[0031] In fact, fig. 5 shows how the same toolhead 1 illustrated in fig. 3 can be mounted on the prismatic base 3 turning it by 180° with respect to the position in fig. 4, setting its abutment 19 against another abutment 20' fixed to the prismatic base 3 in the opposite position to the previous one.

[0032] In this case, the same toolhead 1 can be used to achieve a clearance angle Δ with the ground illustrated in fig. 5 that, as can be seen, is greater than angle α found in the configuration shown in fig. 1 that uses the known type of toolheads described earlier.

[0033] It is clear that the same prismatic base 3 can receive toolheads where the cylindrical hole 13 holds the shank 9 of the ripper tool 10 and the tapering cylindrical body 6 having longitudinal axes 12 and 11 respectively, with different pitches.

[0034] It is thereby possible to achieve different clearance angles with the ground to be removed according to work needs, even though the same ripper drum is always used.

[0035] It is understandable that, in conformity with this explanation, the toolhead invention achieves all the set scopes.

[0036] In practise the working member may be produced with different shapes to those illustrated and described,but preferably it should have the same shapes and sizes as described in the aforementioned patent application numbered VI98U000097.

[0037] All changes that may be made to the working member under this invention shall nevertheless all fall under the protection of this patent.

Claims

1. Toolhead (1) suited to be applied to the prismatic base (3) of a working member (2) for ripper drums (4) of machines for removing ground, comprising:

   - a tapering cylindrical body (6) that is coupled into a corresponding tapering cylindrical hole (5) of said prismatic base (3) and one end (7) having a seat (8) that holds the shank (9) of a ripper tool (10), **characterised in that** the longitudinal axis (11) of said tapering cylindrical body (6) is at an angle to the longitudinal axis (12) of said seat (8).

2. Toolhead (1) according to claim 1) **characterised in that** said seat (8) consists of a cylindrical hole

(13) made in said end (7) that connects with a longitudinal hole (14) made through the length of said tapering cylindrical body (6).

3. Toolhead (1) according to claim 2) **characterised in that** the longitudinal axis (12) of said second cylindrical hole (13) intersects the longitudinal axis (11) of said tapering cylindrical body (6), said axes (11 and 12) being set coplanar to each other.

4. Toolhead (1) according to claim 1) **characterised in that** the longitudinal axis (11) of said tapering cylindrical body (6) has the same longitudinal axis of the tapering cylindrical hole (5) of said prismatic base (3).

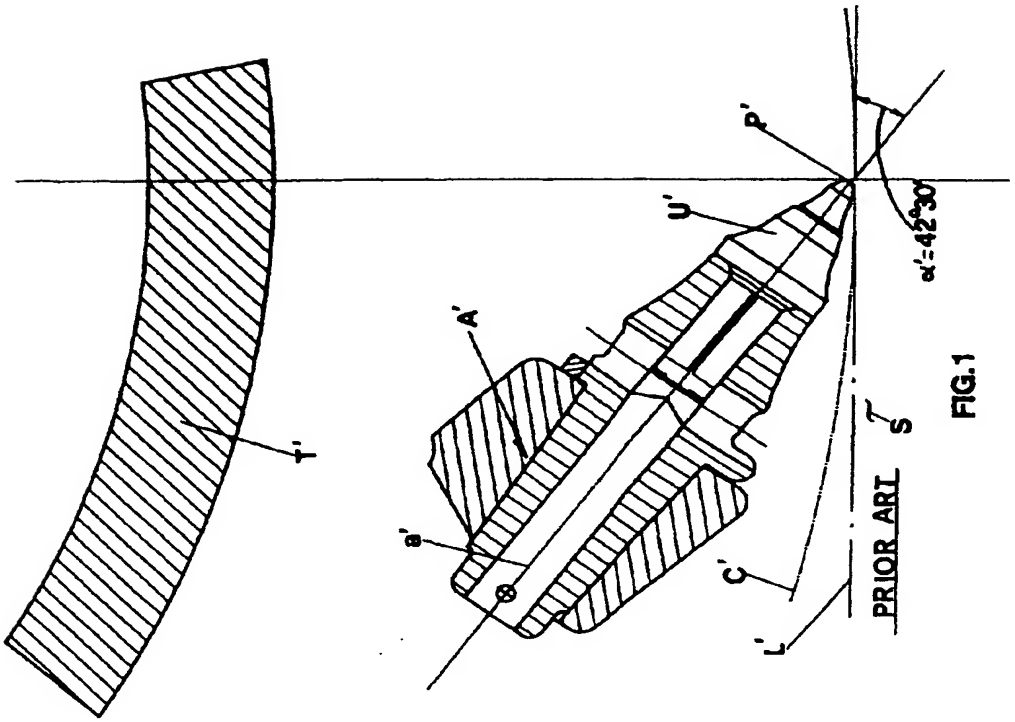
5. Toolhead (1) according to claim 3) **characterised in that** the longitudinal axis (12) of said tapering cylindrical body (6) passes through the centre (15) of the circumference (16) that in said cylindrical hole (13) defines the entry section (17) for said shank (9) of said ripper tool (10).

6. Toolhead (1) according to claim 1) **characterised in that** said tapering cylindrical body (6) and its respective end (7) that holds said ripper tool (10) are connected together by a radial collar (18).

7. Toolhead (1) according to claim 6) **characterised in that** said collar (18) has at least one abutment (19) that is set against a marker (20, 20') fixed to said prismatic base (3).

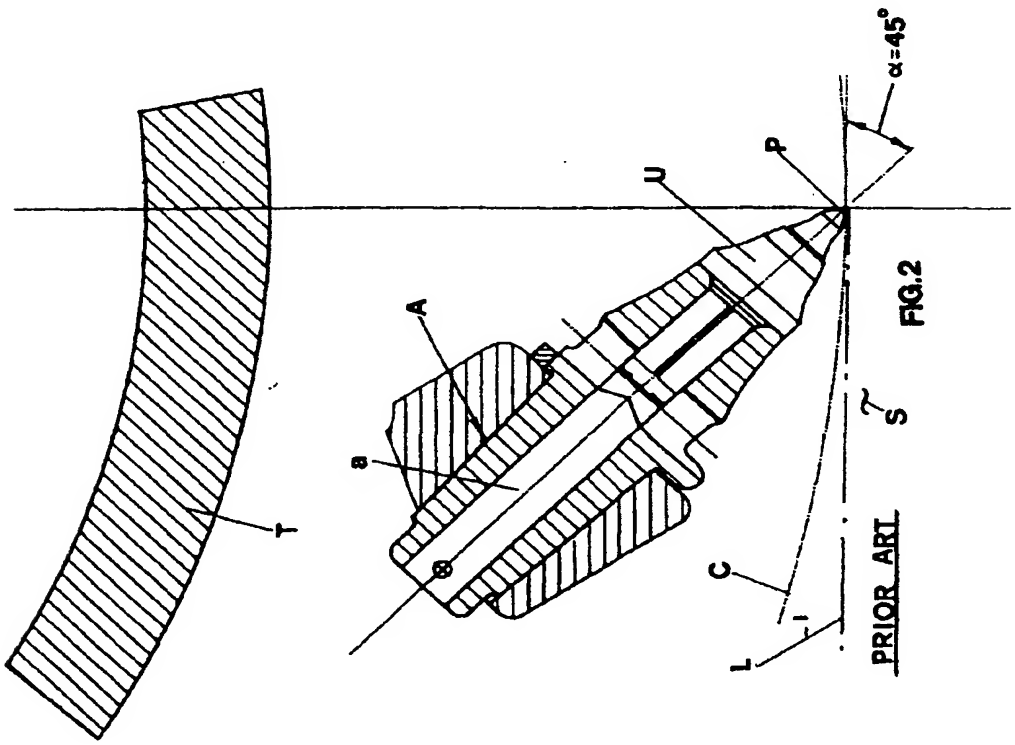
8. Toolhead (1) according to claim 7) **characterised in that** said prismatic base (3) can receive at least one pair of said markers (20, 21).

9. Toolhead (1) according to claim 8) **characterised in that** the markers (20, 20') of at least one of said pair of marker elements, are at 180°, one opposite the other.



PRIOR ART

FIG.1



PRIOR ART

FIG.2

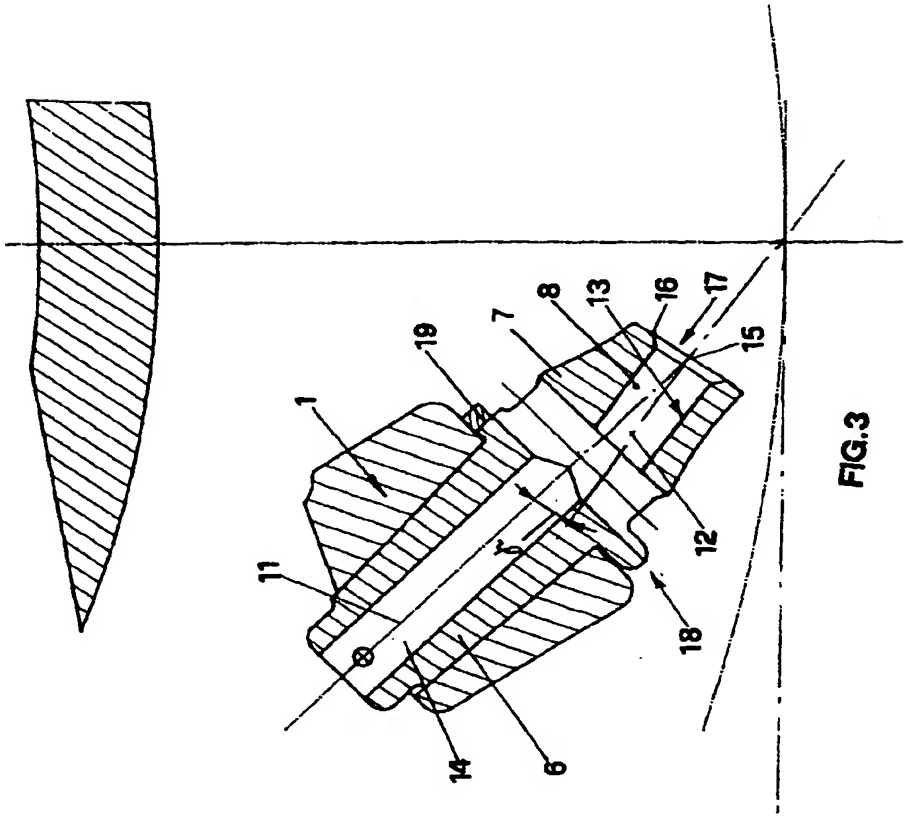


FIG.3

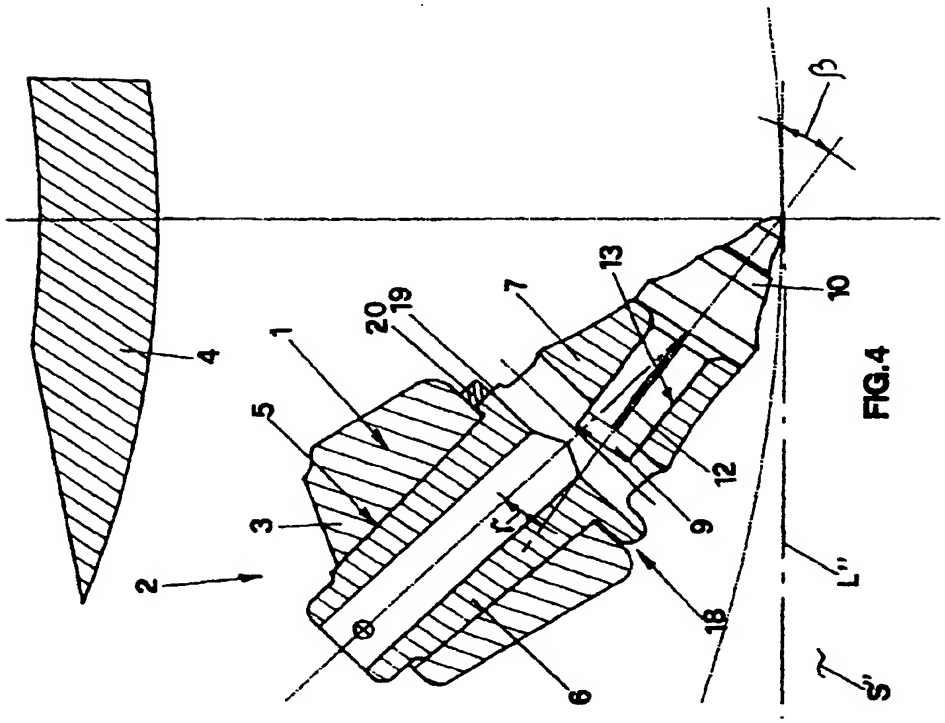


FIG.4

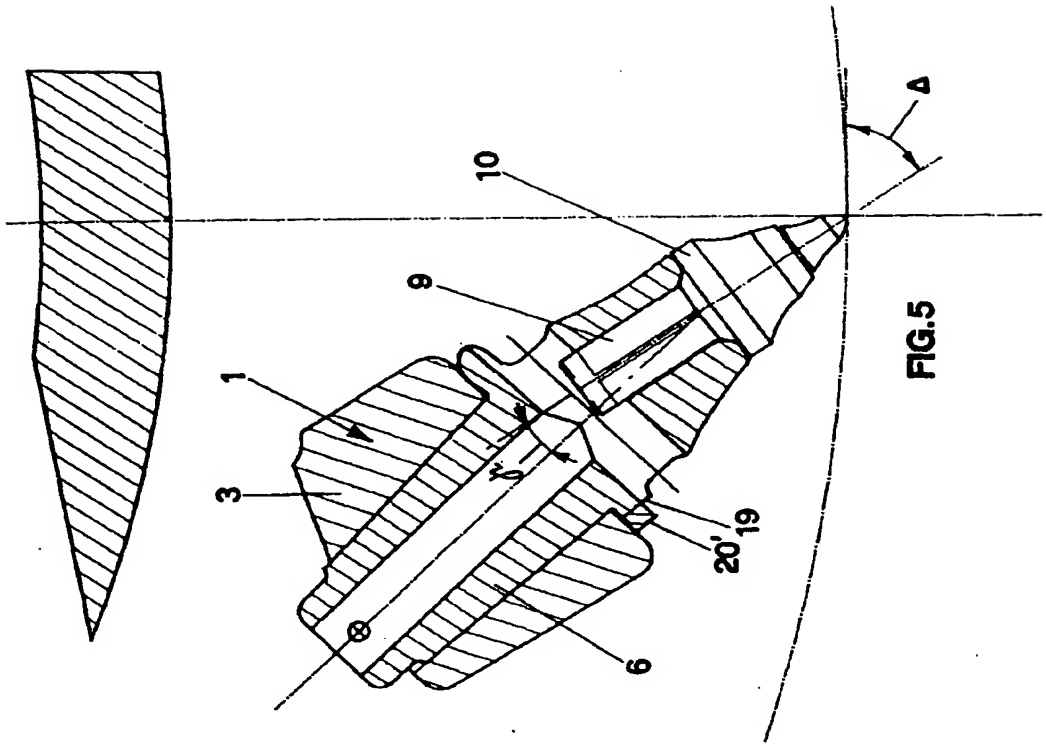


FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 3465

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 36 30 443 A (WORLEY & PARTNER GMBH) 10 March 1988 (1988-03-10) * the whole document * * in particular column 5, line 6 - line 13 * ---	1-4,6-9	B28D1/18
A		5	
X	US 4 337 980 A (KREKELER CLAUDE B) 6 July 1982 (1982-07-06) * column 2, line 44 - column 3, line 68 * * column 7, line 1 - line 26 * * column 9, line 38 - line 55 * * column 10, line 54 - line 62 * * figures 1,4,9,16 * ---	1-4	
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A	US 4 915 454 A (SOUTHERN PHILIP W) 10 April 1990 (1990-04-10) * column 2, line 43 - column 3, line 32 * * figures 1-3 * -----	5	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B28D E21C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 May 2000	Rijks, M

CATEGORY OF CITED DOCUMENTS

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26-05-2000

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